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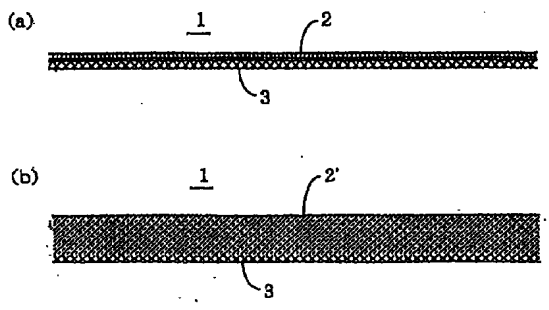
(54) SHEET AND COVER FOR PREVENTING BURNING BY SPREADING FIRE, AND COMBINED FIRE-EXTINGUISHING SHEET AND DISASTER-PREVENTING CLOTHING

(57) A sheet for preventing burning by spreading fire which comprises a water-absorptive polymer material layer being capable of absorbing sprayed water and has flexibility sufficient to change the form thereof corresponding to that of an object with which the polymer layer is in contact. When there is a danger of burning by spreading fire, this sheet can be used for cutting off an object from the fire and preventing the object from burning by rendering the water-absorptive polymer material layer contained therein to absorb an abundance of water and form a water-containing layer.

A sheet and a cover for preventing burning by spreading fire, and a combined fire-extinguishing sheet and disaster-preventing clothing which comprises a surface side comprising a water-absorptive polymer material layer forming a water-containing layer, and, laminated therewith, a back side comprising substrate having functions of fire resistance, heat resistance, insulation, waterproof, elasticity and protection are also provided. They exhibit an enhanced effect of preventing burning by spreading fire and can protect an object with improved reliability.

FIG.1



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Description

THECNICAL FIELD

[0001] The present invention relates to a sheet for preventing burning by the spreading fire comprising a water-absorptive polymer material layer, the sheet being light in weight and being handled and carried easily. The present invention intends to provide a sheet for preventing burning by the spreading fire, the sheet being flexible so that the sheet can be connected both vertically and horizontally so that the sheet can be easily applied for covering an object or the like and can easily absorb or contain water so that enabling making an attempt of preventing the spreading fire with certitude.

[0002] Furthermore, the prevent invention also intends to provide a cover for preventing burning by the spreading fire which enables making an attempt of preventing burning by the spreading fire with certitude by forming in advance the cover into a configuration which conforms to the object.

[0003] Moreover, the present invention relates to a combined fire-extinguishing sheet and disaster-preventing clothing which comprises a water-absorptive polymer material layer, the sheet being light in weight and being simple to be handled and carried. The present invention intends to provide a combined fire-extinguishing sheet and disaster-preventing clothing which is flexible owing to the laminated layer sheet-like state of the clothing so that the clothing can be easily applied to cover the object and which enables making an attempt of extinguishing fire or preventing disaster with certitude by allowing the clothing to absorb or contain water.

BACKGROUND ART

[0004] Owing to a rapid technological innovation in recent years and regulations such as Fire Extinction Law or the like, various fire-resistant structures, facilities or the like have been developed and have become prevalent. In general households, fire-prevention measures has been taken such as usage of fireproof walls, fire-resistant construction materials, fire-resistant curtains or the like and installation of fire extinguishers or the like.

[0005] Furthermore, large-scale facilities such as hotels and factories are controlled under more strict Fire Extinguishing Law and are obliged to install a fire alarm, a fire hydrant or a sprinkler or the like. Then, through a regular practice of the fire prevention training of employees or the like, an attempt is made to raise their consciousness of fire prevention.

[0006] However, almost all of these facilities and technology aim at preventing fire at an initial stage of the generation of fire and an accidental one that constitute the source of overall fire. Naturally, the possibility is high that the aforementioned facilities or the like enables us to prevent fire source from causing fire under our own responsibility. However, when fire occurs in our neighborhood, is it possible for us to prevent burning by the spreading fire?

[0007] Normally, most of important cultural assets such as traditional architectures, and statues of Buddha in temples in Japan are made of wood. Constructions on the premises of temples or the like are constructed in a definite interval and distance. Thus, the possibility of burning of these constructions by the spreading fire might be not so high. However, many of these temples are located in an area of mountains and woods. Furthermore, in recent years, water shortage and dry air occur in many cases. Consequently, in the case where a large-scale forest fire occurs, it is difficult to prevent fire from spreading only by means of cutting down trees and wood, spreading fire extinguishing agents or spraying water. The occurrence of such large-scale forest fire is a problem that must be solved in other countries as well as in Japan.

[0008] According to the present invention, an object of sheet for preventing burning by the spreading fire or a cover for preventing burning by the spreading fire is to prevent burning by the spreading fire by the usage of a dedicated cover for the important architectures, statues of Buddha, pictures or the like, and by the usage of connectable sheets in general cases.

[0009] Furthermore, an object of the present invention is to provide a combined fire-extinguishing sheet and disaster-preventing clothing which can serve both as a fire-extinguishing sheet which can be preferably used to bring the fire under control at an early stage and at the time of evacuation or as a coat for disaster prevention.

[0010] Conventionally, the following prior art is known as one which can be used as such water-absorptive sheet and which aims at preventing disaster caused by the leakage of water.

1) Fire-Extinguishing and Fire-Prevention Method Using Water Lump (Japanese Utility Model Application Laid-Open No. SHO 61-284260)

[0011] There is provided a water-containing textile which is allowed to absorb water to form a lump of water thereby preventing the disaster of water leakage.

2) Water-Absorptive Sheet for Prevention of Water Leakage (Japanese Utility Model Application Laid-Open No. HEI 04-147850)

[0012] An object of the prior art is to detect at early stages of the water leakage portion and to prevent disaster by making use of a water-absorptive sheet.

3) Water-absorptive Sheet (Japanese Utility Model Application Laid-Open No. HEI 04-234640)

[0013] An object of the prior art is to prevent disas-

ter caused by the water leakage to condominiums.

4) Water-absorptive Sheet Structure (Japanese Utility Model Application Laid-open No. HEI 04-132934)

[0014] An object of the prior art is to remove water at the time of indoor flood caused by the spaying of water and/or the rapture of water distributing pipes.

[0015] A main object of the prior art is to reduce the water leakage caused by spraying of water and water leakage or the like and to use the art as a sheet for absorbing water. Consequently, the heat-endurance and the heat-insulation of the object is not considered so that the effect of preventing the spreading fire is weak.

[0016] Furthermore, the following prior art is known as art for use in the fire prevention by allowing clothing or the like to absorb water by using a water-containing layer for the clothing or the like.

5) Simple Heat-Insulation Sheet (Japanese Utility Model Application Laid-Open No. HEI 01-145138)

[0017] There is provided a hood and clothing for use at the time of evacuation in which a metal film, a textile base body and a sponge-like base are polymerized and a water-absorptive sheet is used.

6) complicated Textile Structure Which Can Be Used in Clothing for Disaster Prevention (Japanese Utility Model Application Laid-Open No. HEI 09-267441)

[0018] There is provided a structure having the functions of heat-endurance, heat-insulation, water-absorption, water-contain and fire-prevention by allowing water to be absorbed therein.

7) Box for Evacuation and for Stocking Products in Fire or the Like (Japanese Utility Model Application Laid-Open No. SHO 48-94299)

[0019] The invention relates to a container provided with a water absorptive layer.

8) Fire-Resistance and Heat-Insulation Material and Fire-Resistance and Heat-Insulating Container (Japanese Utility Model Application Laid-Open No. HEI 03-223597)

[0020] The container according to the invention described above has a fire-resistance and heat-insulation function through the formation of a water-containing layer in advance.

10) Fire Prevention Sheet (Japanese Utility Model Application Laid-Open No. SHO 61-118728)

[0021] There is provided a constitution of an integrated sheet in which a textile mat and a plastic sheet are detachably engaged with each other. Since water is allowed to be absorbed at the time of usage and a water-containing layer is formed, the sheet is excellent in fire-resistance. A main object of this practical utility is to prevent fire or the like at construction sites of welding or at kitchens, the sheet is light in weight and excellent in flexibility. However, since a plastic sheet is used, the functions of heat-endurance and fire-prevention are inferior.

[0022] The conventional inventions described above are not intended to prevent burning by the spreading fire as described above. The object of these inventions is to prevent burning by the spreading fire from neighborhood fire, large-scale fire, forest fire or the like that cannot be prevented.

[0023] In Japan, a large number of scattered historical cultural assets which has been handed down from the ancient times lie scattered in Japan and these treasures assets must be protected. What is more, most of these important cultural assets are the wooden architectures. These important cultural assets must be handed down to the future generations without fail. The cover for preventing burning by the spreading fire has been invented for prevent the burning by the spreading fire of the individual national treasures and important cultural assets including architectures, statues of Buddha, pictures and the like that must be protected.

[0024] In some cases, fire-prevention water basins are installed in the vicinity of precious national treasures and important cultural assets. However, with only such means, it is difficult to protect the treasures and assets completely from forest fire which is imminent in the back and near. Furthermore, it is a fact that many of these national treasures and important cultural assets are located at the places such as mountains et al where it is inconvenient to put out a fire. When the cover for preventing the burning by the spreading fire according to the present invention is available, the effect of fire prevention is very conspicuous only with the facilities of fire-prevention basins or the like. Then, it enables to hand down the national treasures and important cultural assets without fail to the posterity.

[0025] It goes without saying that one may consider it impossible to prepare a dedicated cover for preventing burning by the spreading fire for each of all the architectures all over Japan. However, this does not lead to a conclusion that architectures other than historical cultural treasures may well be burnt down. Then, a sheet for preventing the burning by the spreading fire for preventing the burning by the spreading fire of general buildings has been designed. Naturally, the scale of fire and the size of objects differ. Therefore, the sheet for preventing burning by the spreading fire is formed in a configuration that can be connected vertically and horizontally so that the size can be changed depending on situations. In addition, in case of fire that occurs in the streets or the like, telegraph poles and electric wires

must be taken into account. In the usage thereof in such area, materials with a lining layer provided with a function of insulation are to be used in consideration of a possibility that the electric wires might come into contact with the sheet for preventing burning by the spreading fire.

[0026] In other words, the present invention not only comprises a surface side comprising a water-absorptive polymer material layer forming a water-containing layer but also laminated therewith, a back side comprising a substrate having functions of fire resistance, heat resistance, insulation,waterproof, elasticity and protection are also provided to enhance the effectiveness of preventing burning by spreading fire, and result in providing a combined fire-extinguishing sheet and disaster-preventing cover which enables to protect objects with certitude.

[0027] It goes without saying that another object of the present invention is to provide a novel combined fire-extinguishing sheet and disaster-preventing clothing which may be used not only for the aforementioned prevention of burning by the spreading fire but also may serve as both a fire-extinguishing sheet which can be preferably used to bring the fire under control at an early stage and at the time of evacuation, and as a coat for disaster prevention.

DISCLOSURE OF THE INVENTION

[0028] The sheet for preventing burning by the spreading fire according to the present invention is characterized in that the sheet for preventing burning by spreading fire which comprises a water-absorptive polymer material layer being capable of absorbing sprayed water and has flexibility sufficient to change the form thereof corresponding to that of an object from the fire and layer is in contact, and that when there is a danger of burning by spreading fire, this sheet can be used for cutting off an object from the fire and preventing the object from burning by rendering the water-absorptive polymer material layer contained therein to absorb an abundance of water and form a water-containing layer.

[0029] The sheet for preventing burning by the spreading fire according to this invention is characterized in that the water-absorptive polymer material layer comprises water supply means such as a hose or the like.

[0030] The sheet for preventing burning by the spreading fire according to the present invention is characterized in that the sheet is formed in a certain size, and connection means is provided at an end fringe thereof so that the sheet can be connected vertically or horizontally by means of connection means to cover to protect individual objects.

[0031] The sheet for preventing burning by the spreading fire according to the present invention is characterized in that a reinforcement layer comprising a base material layer is formed and connection means is provided thereto.

[0032] The sheet for preventing burning by the spreading fire according to the present invention is characterized in that the connection means is a rope or the like.

[0033] The sheet for preventing burning by the spreading fire according to the present invention is characterized in that the connection means is a hook or the like which can be detached.

[0034] The cover for preventing burning by the spreading fire according to the present invention is characterized in that the cover comprises a water-absorptive polymer material layer which is capable of absorbing sprayed water and has a configuration which conforms to an external configuration of important cultural assets represented by statues of Buddha, pictures and the like, and important objects so that the cover is used as a dedicated cover to entirely wrap up the whole of the objects.

[0035] The cover for preventing burning by the spreading fire according to the present invention is characterized in that the cover comprises a water-absorptive polymer layer which is capable of absorbing sprayed water and the cover can be used as a dedicated half cover which conforms to the configuration of one surface of an object for preventing burning by the spreading fire of a huge architectures such as shrines and temples.

[0036] The cover for preventing burning by the spreading fire according to the present invention is characterized in that the sheet for preventing burning by the spreading fire comprising a water-absorptive polymer material layer which is capable of absorbing sprayed water is kept in a dry state at normal times, wherein the cover shields an object from fire for preventing burning by the spreading fire, and that when there is a danger of burning by spreading fire, this sheet can be used for cutting off an object from the fire and preventing the object form burning by rendering the water-absorptive polymer material layer contained therein to absorb an abundance of water and form a water-containing layer.

[0037] The sheet for preventing burning by the spreading fire according to the present invention is characterized in that the water-absorptive high polymer material layer comprises water supply means such as a hose or the like.

[0038] The combined fire-extinguishing sheet and disaster-preventing clothing according to the present invention is characterized by comprising a formation of a laminated sheet having a predetermined size by laminating a water-absorptive polymer material layer which is capable of absorbing sprayed water and a waterproof sheet so that the water-absorptive polymer layer of the laminated sheet is allowed to contain water to be used when needed.

[0039] The combined fire-extinguishing sheet and disaster-preventing clothing according to the present

invention is characterized in that the laminated sheet having a predetermined size comprises connection means at an appropriate portion thereof.

[0040] The combined fire-extinguishing sheet and disaster-preventing clothing according to the present invention is characterized in that the connection means comprises a button, a hook, a surface fastener or the like.

[0041] The combined fire-extinguishing sheet and disaster-preventing clothing according to the present invention is characterized in that the lamination sheet with its size having a predetermined is used as a fire-extinguishing sheet by allowing the water-absorptive polymer material layer facing down with water contained therein, or by allowing the water-absorptive polymer material layer to be used as the surface on top without having the layer contain any water therein.

[0042] The combined fire-extinguishing sheet and disaster-preventing clothing according to the present invention is characterized in that the lamination sheet with its size having a predetermined is used as a disaster-preventing clothing by allowing the water-absorptive polymer material layer as the surface side on top with water contained therein, or by allowing the water-absorptive layer reversed to be the inside without having the layer absorb water therein.

BRIEF DESCRIPTION OF THE DRAWINGS

[0043]

Fig. 1 is a view for explaining a basic structure of a sheet for preventing burning by the spreading fire according to the present invention; Fig. 1(a) being a schematic sectional view showing a state before water absorption, and Fig. 1(b) being a schematic view showing a state after water absorption respectively.

Fig. 2 is a schematic perspective view showing a reinforcement structure of a sheet for preventing burning by the spreading fire.

Fig. 3 is a schematic perspective view for explaining a way for connecting the sheet for preventing burning by the spreading fire.

Fig. 4 is a schematic view showing an example in which the sheet for preventing burning by the spreading fire according to the present invention is applied to a statue of Buddha.

Fig. 5 is a schematic view showing an example in which the cover for preventing burning by the spreading fire according to the present invention is applied to architectures as a half cover.

Fig. 6 is a schematic sectional view showing another embodiment of the sheet for preventing burning by the spreading fire according to the present invention.

Fig. 7 is a view showing an embodiment of the combined fire extinguishing sheet and disaster preventing clothing according to the present invention with water contained therein; Fig 7(a) showing an example of use as a fire-extinguishing sheet and Fig. 7(b) showing an example of use as a disaster-preventing clothing.

Fig. 8 is a view showing an embodiment of the combined fire extinguishing sheet and disaster preventing clothing according to the present invention without containing water therein; Fig. 8(a) showing an example of use as a fire-extinguishing sheet, and Fig. 8(b) showing an example of use as disaster-preventing clothing.

Fig. 9 is a plan view of an essential portion.

Fig. 10 is schematic view in which the structure shown in Fig. 9 is extended to a predetermined length, and the structure can be used as a disaster-preventing coat.

BEST MODE FOR CARRYING OUT OF THE INVENTION

[0044] Hereinbelow, the best form of embodying the sheet for preventing burning by the spreading fire, the cover for preventing burning by the spreading fire, and the combined fire-extinguishing sheet and disaster-preventing clothing will be explained on the basis of the drawings.

[0045] Figs. 1(a) and 1(b) are schematic sectional views showing one embodiment of the sheet for preventing burning by the spreading fire according to the present invention. The sheet 1 for preventing burning by the spreading fire comprises a water-absorptive polymer material layer 2 which can absorb or contain sprayed water as shown in Fig. 1(a) and a base material layer 3 having the functions of fire-resistance and water-resistance wherein the sheet has flexibility sufficient to change the form thereof corresponding to that of an object with which the polymer layer is in contact. When there is a danger of burning by spreading fire, the object is shielded with this sheet 1 for preventing burning by the spreading fire. At the same time, the sheet 1 for preventing burning by the spreading fire is allowed to absorb an abundance of water in the water-absorptive polymer material layer 2 so that a water-containing layer 2' as shown in Fig. 1(b) is formed thereby preventing burning by the spreading fire.

[0046] As to the water-absorptive polymer material layer 2 which can absorb or contain sprayed water, a water-absorptive polymer material such as, for example, sodium polyacrylate cross-linker is used. As to these water-absorptive polymer materials, materials on various grades are sold on the market. The amount of water absorption reaches 10 to 500 times in volume so that the material can be arbitrarily selected to be used.

[0047] Furthermore, the water-absorbing high polymer material can be used singly in the form of a textile-like substance, a sponge-like substance, and in other forms as a water-absorptive polymer material layer 2.

Furthermore, the polymer material may be mixed with incombustible or fire-retardant textile or the like, or mixed in or connected to various kinds of material thereby heightening an effect of preventing burning by the spreading fire. At the same time, the water-absorbing polymer material layer 2 having a stronger strength can be obtained so that the base material layer 3 can be omitted.

[0048] Next, as to fire-resistance and water-resistance base material layer 3, incombustible materials such as, for example, aluminum-made or other metal-made sheets or the like, textile sheets or the like comprising such as woven fabrics or unwoven fabrics such as quilting which have been subjected to incombustiblity treatment and water-resistance treatment, plastic sheets or the like are preferably used. Furthermore, it is also possible to preferably provide a laminated layer structure with an incombustible heat-insulation layer whose concentration is set to a low level with various kinds of foaming agents. The fire-resistance and water-resistance base material layer 3 which is constructed in the aforementioned manner also has the functions of heat-insulation, insulation and heat-endurance so that the object can be protected with certitude.

[0049] The water-absorptive polymer material layer 2 which can absorb or contain sprayed water adheres to the base material layer 3 with an adhering agent or can be laminated by using means such as heat or sewing. Incidentally, the surface of the water-absorptive polymer material layer 2 can be covered with woven fabrics, films or the like. In such cases, it is neccessary to form the woven fabrics and films or the like into a net-like configuration or to provide a structure which allows water to pass therethrough by means of punching or the like. Furthermore, it is possible to attach a water supply spout (not shown) on the water-absorptive polymer material layer 2 so that the polymer material layer 2 can be connected to a water tap of a water service to enable water to be supplied to the polymer material layer 2. Naturally, when tubes or the like are connected to the water supply spout, and are installed along the water-absorptive polymer material layer 2, it would be more effective.

[0050] The sheet 1 for preventing burning by the spreading fire can be formed into an appropriate size. For example, the sheet 1 can be formed into a square or a rectangle configuration of 100 to 150cm sides. Then, when a fire breaks out, the sheet 1 for preventing burning by the spreading fire is to be immersed in water that has been stored in a container such as bath tub so that water is sufficiently contained in the water-absorptive polymer material layer 2. Then, with the surface of the water-containing layer 2' facing down, the sheet can be used to extinguish fire by covering the sheet directly on a portion which is on fire. This is effective for extinguishing fire of a gas cooking stove, a cooking oil or the like.

[0051] Naturally, the above sheet 1 for preventing burning by the spreading fire has a size of 3 to 10 meters long and is further connected as shown in Figs. 2 and 3 so that the sheet 1 can be applied to objects such as national treasures or important cultural assets including architectures, statues of Buddha, pictures or the like to protect from fire.

[0052] In Figs. 2 and 3, reference numerals 4 and 5 denote connection means provided on the end fringes of the sheet 1 for preventing burning by the spreading fire. Reference numeral 4 denotes a reinforcement layer which is formed by folding either to a surface or the back side at the end fringe of the base material layer 3 of the sheet 1 for preventing burning by the spreading fire. Reference numeral 5 denotes a plurality of small holes provided on the reinforcement layer in an appropriate interval. Reference numeral 6 denotes a rope or the like. Consequently, more than one sheet of sheet 1 for preventing burning by the spreading fire are connected to each other by allowing the rope or the like 6 to pass through the small holes 5 thereby enabling the sheets to be applied to objects such as national treasure and important cultural assets which must be protected from fire without any difficulty.

[0053] In place of the above ropes 6, detachable hooks, fasteners such as surface fasteners and the like, buttons and snap fasteners, pins, a combination of projections and recesses, ultrasonic wave processing, hoses or the like can be used as connection means. For the use of hoses or the like, the aforementioned water supply spout is to be used or the hoses or the like are to be directly connected to the water tap or the like, so that water can be sufficiently supplied to the water-absorptive polymer material layer 2. Furthermore, when the sheets are connected to each other, water can also be supplied to the adjacent water-absorptive polymer material layer 2.

[0054] In the sheet 1 for preventing burning by the spreading fire, a frame using plastic pipes, metal-made wires, angle materials or the like can be integrally combined in advance. Then, it is desirable that even when the sheet 1 for preventing burning by the spreading fire contains water, the sheet 1 can endure its own weight with the result that no damage is caused to the object which must be protected from fire even if the object is fragile. In such cases, the sheet can be installed anywhere both indoors and outdoors.

[0055] The sheet 1 for preventing burning by the spreading fire can be used as a fireproof wall which can be installed by itself by connecting a plurality of such sheets with connection means. Furthermore, the fireproof wall can be constructed by using houses, electric poles and trees or the like for outdoors, or by using a pillar, a hook (provided in the construction or attached in advance on the sheet 1 for preventing burning by the spreading fire) or the like for indoors.

[0056] Furthermore, it is desirable that the sheet 1 for preventing burning by the spreading fire can be kept in custody in a compact state by folding and conserving the sheet 1 for preventing burning by the spreading fire

in a dry state so that the sheet 1 can be spread to be used when needed.

[0057] Then, when the possibility rises so high that some national treasures or important cultural assets might be burnt by the spreading fire, the fireproof function can be fulfilled by allowing the water-absorptive polymer material layer 2 on the surface side of the sheet to sufficiently absorb water by means of scattering or supplying water to form a water-containing layer 2'. In other words, with a rise in the temperature of the surrounding area because of fire, the moisture content absorbed in the water-containing layer 2' (the water-absorptive high polymer material layer 2) is vaporized little by little so that steam is generated. By means of this action, the vaporization heat is deprived of at the portion of the water-containing layer 2' thereby suppressing a rise in the temperature for a considerably for a long time. By continuing the spraying and supplying of water to the water-absorptive polymer material layer 2 at regular intervals, this action can be maintained longer.

[0058] Additionally, in this case, the object is protected from water leakage with the waterproof function of the base material layer 3 on the back side of the sheet 1, while, a higher effect on preventing burning by the spreading fire can be obtained by means of the functions of fire-resistance, heat-insulation, and insulation with which the base material layer 3 is furnished.

[0059] Figs. 4 and 5 are schematic sectional views showing respectively an embodiment of the sheet for preventing burning by the spreading fire according to the present invention.

[0060] The embodiment shown in Fig. 4 is such that the cover 11 for preventing burning by the spreading fire comprising the water-absorptive polymer material layer 2 which can absorb or contain sprayed water and the base material layer 3 having the functions of fire-resistance and water-resistance has a configuration which conforms to the external configuration of the important object 12 comprising a statue of Buddha. The cover 11 is used as a dedicated cover to wrap the whole of the object 12.

[0061] Naturally, when using the cover 11, the water-absorptive polymer material layer 2 on the surface side is allowed to sufficiently absorb water by means of spraying of water to form a water-containing layer 2' so that the fireproof function can be fulfilled.

[0062] The embodiment shown in Fig. 5 is such that the cover 21 for preventing burning by the spreading fire, which is comprised of the water-absorptive polymer material layer 2 which can absorb or contain sprayed water and of the base material layer 3 which has the functions of fire resistance and water-resistance, has a configuration which conforms to the external configuration of huge architectures 22 such as shrines and temples. The cover 21 is used as a dedicated cover for covering only the half side of the constructions 22. Also, when using the cover 21, the water-absorptive polymer material layer 2 on the surface side is allowed to sufficiently absorb water by means of spraying of water or the like to form a water-containing layer 2' so that the fireproof function can be fulfilled.

[0063] In these embodiments, a frame using a plastic pipes and metal-made wires, angle material or the like can be combined in advance into the cover 21 for preventing burning by the spreading fire. Then, it is desirable that the cover 21 for preventing burning by the spreading fire can endure its own weight even when the cover 21 absorbs water and consequently no damage is caused to the object which should be protected from fire even when the object is fragile.

[0064] Incidentally, apart from the frame which is combined into the sheet 1 for preventing burning by the spreading fire and the cover 21 for preventing burning by the spreading fire, a frame which is independently constructed may be prepared and provided on the object that should be protected from fire. When such measures is taken, the sheet 1 for preventing burning by the spreading fire and the cover 21 for preventing burning by the spreading fire can be used in light weight as it is. Further, no damage can be caused to the object which should be protected from fire even when the object is fragile.

[0065] Fig. 6 is a schematic sectional view showing another embodiment of the sheet for preventing burning by the spreading fire according to the present invention. In this embodiment, there is shown a case in which the sheet is used as an inside panel (a roofing material or the like) of a roof of an architecture. In other words, the sheet 31 for preventing burning by the spreading fire comprises at least a waterproof sheet layer 32 and a water-absorptive polymer material layer 33. And, the architecture is made so that the sheet 31 is arranged beneath the roof material 34 such as tiles or the like in such a manner that the waterproof sheet layer 32 is placed as a top layer while the water-absorptive polymer material layer 33 is placed facing down.

[0066] In such a constitution, when the roof material 34 is fixed with nails 35 or the like, the water-absorptive polymer material layer 33 can absorb water at the time of rain with the result that the infiltration of rain into the base portion of the roof may be prevented. Further, absorbed moisture content is dried at the time of fine weather so that the water-absorbing polymer material layer 33 returns to the original state. Consequently, the rain leakage can be prevented with certitude as can be seen in the case where the roof material is fixed by using nails or the like to the conventional waterproof sheet.

[0067] Naturally, in case fire breaks out, by allowing the water-absorptive polymer material layer 33 to sufficiently absorb water by means of spraying of water or the like to form a water-containing layer, the whole inner side of the roof is provided with a fireproof function to attain an object of the prevention of burning by the spreading fire. Consequently, the water-absorptive polymer material layer 33 can be used as a wall material or

the like of an inner and outer wall in the same manner so that the architecture or the like can be provided with more effective function of preventing burning by the spreading fire.

[0068] Fig. 7 is a schematic sectional view showing an embodiment of a combined fire-extinguishing sheet and disaster-preventing clothing according to the present invention, a case in which the sheet contains water to be used. Fig. 8 is a schematic sectional view showing a case in which the sheet is used without allowing the sheet to contain water. Fig. 9 is a plan view of an essential portion thereof. The combined fire-extinguishing sheet and disaster-preventing clothing is used by the formation of a laminated sheet 41 having at least a predetermined size by laminating a water-absorptive polymer material layer 42 which is capable of absorbing sprayed water and a waterproof layer 43 so that the water-absorptive polymer material layer 42 of the laminated sheet 41 is allowed to absorb water when need to be used.

[0069] In other words, Fig. 7 shows a case in which the water-absorptive polymer material layer 42 is allowed to absorb water to be used. Fig. 7(a) shows an example in which the invention is used as a fire-extinguishing sheet in which the water-absorptive polymer material layer 42 is used facing down so that the water-absorptive material layer 42 is allowed to contain water to be directly applied to the case of fire. Furthermore, Fig. 7(b) is a case in which the invention is used as a disaster-preventing coat in which the water-absorptive material layer 42 is used as a surface side on top so that the water-absorptive polymer material layer 42 is allowed to contain water to be applied to a surface on which sparks fall.

[0070] Fig. 8 shows a case in which the invention is used without allowing the invention to absorb water. Fig 8(a) shows an example in which the invention is used as a sheet for extinguishing fire wherein the water-absorptive material layer 42 is used as the surface side on top while a waterproof sheet layer 43 is applied to fire so that the supply of air is shielded to extinguish fire. Furthermore, Fig. 8(b) shows a case in which the invention is used as a disaster preventing coat in which the waterproof sheet layer 43 is used as a surface side on top to be applied to the side to which sparks fall.

[0071] Incidentally, it is desirable that the lamination sheet 41 having a predetermined size is provided with connection means at the portion as shown in Fig. 9. As this connection means, a button 44, a hook, a surface fastener 45 or the like can be preferably used. In Fig. 9, a pair of surface fastener 45 located at the back of the head is connected together, and a pair of buttons 44 located under the neck are connected together so that those who evacuate can apply them on the head to use them as a hood for disaster prevention.

[0072] An embodiment shown in Fig. 10 is such that the structure same as Fig. 9 is extended to a predetermined length so that the structure can be used as a disaster-preventing coat. In other words, the disaster-preventing coat in this embodiment is such that the water-absorptive polymer material layer 42 is used as a surface side on top which is allowed to contain water to be applied to the side on which sparks fall. Naturally, the surface and the backside can be reversibly to be used.

[0073] In each of the embodiments described above, an explanation is made by taking an example of the disaster-preventing coat. It goes without saying that the embodiment can be used as a hood for disaster prevention for school children or the like to evacuate from a disaster or at a state of emergency. Furthermore, most of the explanation concerns a two-layer structure comprising a water-absorbing polymer material layer and a waterproof sheet layer. It goes without saying that the structure may be a sandwich-like three-layer structure and a repeatedly laminated multi-layer structure.

Industrial Applicability

[0074] The sheet for preventing burning by the spreading fire or the cover for preventing burning by the spreading fire according to the present invention, is used by a water-absorptive polymer material layer aiming at absorbing water coming on top surface to be applied to the object that should be protected from fire. Then, a possibility rises that the object might be burnt by the spreading fire, the surface side is rendered to sufficiently absorb water to form a water-containing layer. After that, as a temperature rises higher in the surrounding area, the moisture content absorbed in the water-containing layer (the water-absorptive polymer material layer) is evaporated little by little to form a steam. With this vaporization action, a temperature at the portion of the water-containing layer can be kept from rising higher for a considerably long time. Naturally, the fire-preventing action can be maintained longer with the continuation of the scattering water on a regular basis.

[0075] In addition, the object is protected from fire with the water-resistance action of the base material layer which has functions of a fire-resistance and water-resistance. At the same time, the action of the heat-endurance, the heat-insulation and the insulation or the like in the base material layer provides a higher effect of preventing burning by the spreading fire.

[0076] Furthermore, a combined fire-extinguishing sheet and disaster-preventing clothing can be used not only as a fire-extinguishing sheet to bring the fire under control at an early stage but also as a clothing for disaster prevention at the time of evacuation. The clothing can be kept in general household on a normal basis so that the clothing can be simply used in case of emergency.

[0077] The usage of the sheet for preventing burning by the spreading fire, the cover for preventing burning by the spreading fire, and a combined fire extinguishing sheet and disaster preventing clothing will be described as follows.

(Usage for Protecting Human Lives)

[0078] The invention can be used as coats for covering the fire-fighter's clothing or as evacuation coats to enable fire fighters or the like to protect themselves in the case where the fire flame is too strong at the scene of fire or the like.

[0079] The invention can be used at the time of saving people on the fire sites or the like as a life-saving sheet for wrapping people to be saved, a life-saving coat to be put on, a saving sheet which serves simply as a fireproof wall, and an evacuation sheet to be covered until the fire flame becomes weak.

(Usage for Protecting Both Human Lives and Treasures)

[0080] The invention may be used as the fire-extinguishing sheet to cover a gas cooking stove or the like provided with a button, a hook, a surface fastener or the like provided which may then be used as a hood for disaster prevention or as a coat for evacuation from disaster by rendering it to absorb water at the time of evacuation from disaster.

[0081] Normally, the invention is used as a bed cover, a sofa cover, a curtain, an ornament hung on wall (pictures or the like are painted on the surface with its opposite side provided with water absorptive layer), which are allowed to absorb water to be used as a fire-extinguishing sheet or as a coat for evacuation from disaster.

(Usage for Protecting Treasures)

[0082] The invention is used as a sheet cover for protecting fire-extinguishing devices from fire, heat, water leakage or the like at the scene of fire or the like.

[0083] The invention is used as a sheet cover for protecting important objects such as vehicles, airplanes or the like at the scene of fire or the like.

[0084] The invention is used as a dedicated cover or a dedicated case for completely protecting important objects at the time of transportation of such important objects.

[0085] The invention is used as a lining of walls or as a lining of floor to allow the lining to be provided with a function of preventing water leakage and of serving as a fireproof wall as a building material.

(Effect for the Reduction in the Water Leakage Disaster by the Scattering of Water at the Time of Fire)

[0086] The invention is used as a sheet which serves as a simple fire-resistance wall inside of architectures or the like.

Claims

1. A sheet for preventing burning by the spreading fire comprising:

a water-absorptive polymer material layer being capable of absorbing or containing sprayed water;
wherein the sheet has flexibility sufficient to change the form thereof corresponding to that of an object with which the polymer layer is in contact, and when there is a danger of burning by spreading fire, this sheet can be used for cutting off an object from the fire and preventing the object from burning by rendering the water-absorptive polymer material layer contained therein to absorb an abundance of water and form a water-containing layer.

2. The sheet for preventing burning by the spreading fire according to claim 1, wherein the water-absorptive polymer material layer comprises water supply means such as a water supply spout or the like.

3. The sheet for preventing burning by the spreading fire according to claim 1 or claim 2, wherein the sheet is formed in a certain size, and connection means is provided at an end fringe thereof so that the sheet can be connected vertically and horizontally by means of connection means to protect individual objects.

4. The sheet for preventing burning by the spreading fire according to claim 3, wherein a reinforcement layer comprising a base material layer is formed and connection means is provided therewith.

5. The sheet for preventing burning by the spreading fire according to claim 3 or claim 4, wherein the connection means is a rope or the like.

6. The sheet for preventing burning by the spreading fire according to claim 3 or claim 4, wherein the connection means is a hook or the like that can be detached.

7. The sheet for preventing burning by the spreading fire according to claim 3 or claim 4, wherein the connection means is a hose or the like through which water can be allowed to pass therethrough.

8. A sheet for preventing burning by the spreading fire comprising a water-absorptive polymer material layer which is capable of absorbing sprayed water and has a configuration which conforms to an external configuration of important cultural assets represented by statues of Buddha, pictures and the like, and important objects so that the cover is used as a dedicated cover to wrap completely the whole of the objects.

9. A sheet for preventing burning by the spreading fire comprising a water-absorptive polymer layer which is capable of absorbing sprayed water and the cover can be used as a dedicated half cover which conforms to the configuration of one surface of an object for preventing burning by the spreading fire of a huge architectures such as shrines and temples.

10. A sheet for preventing burning by the spreading fire comprising a water-absorptive polymer material layer which is capable of absorbing sprayed water is kept in a dry state at normal times; wherein the sheet can be used for cutting off an object from the fire and preventing the object from burning by rendering the water-absorptive polymer material layer contained therein to absorb an abundance of water and form a water-containing layer.

11. The sheet for preventing burning by the spreading fire according to any of claims 8 through 10, wherein the water-absorptive polymer material layer comprises a water supply means such as water supply spout or the like.

12. A combined fire-extinguishing sheet and disaster-preventing clothing comprising a formation of a laminated sheet having a predetermined size by laminating a water-absorptive polymer material layer which can is capable of absorbing sprayed water and a waterproof sheet so that the water-absorptive polymer layer of the laminated sheet is allowed to contain water to be used when needed.

13. The combined fire-extinguishing sheet and disaster-preventing clothing according to claim 12, wherein the laminated sheet having a predetermined size comprises connection means at an appropriate portion thereof.

14. The combined fire-extinguishing sheet and disaster-preventing clothing according to claim 12, wherein the connection means comprises a button, a hook, a surface fastener or the like.

15. The combined fire-extinguishing sheet and disaster-preventing clothing according to any of claims 12 through 14, wherein the clothing is used in case where the lamination sheet having a predetermined size is used as a fire-extinguishing sheet, by allowing the water-absorptive polymer material layer to be used as facing down forming a water containing layer, or by allowing the water-absorptive polymer material layer to be used as the surface side on top without having any water contained therein.

16. The combined fire-extinguishing sheet and disaster-preventing clothing according to any of claims 12 through 14, in case where the lamination sheet having a predetermined size is used as clothing for disaster prevention, wherein the clothing is used by allowing the water-absorptive polymer material layer to be used as the surface side to contain water, or by allowing the water-absorptive layer to be used as the back side without having any water contained therein.

FIG.1

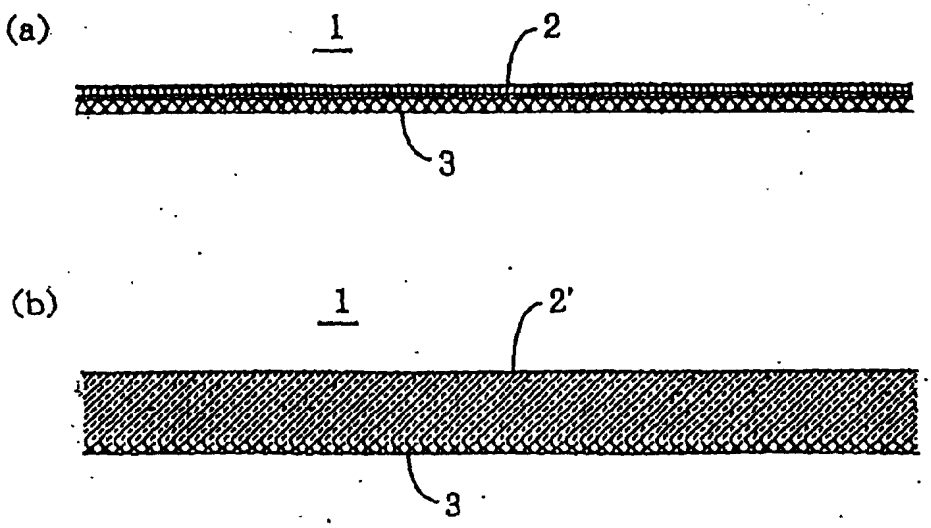


FIG.2

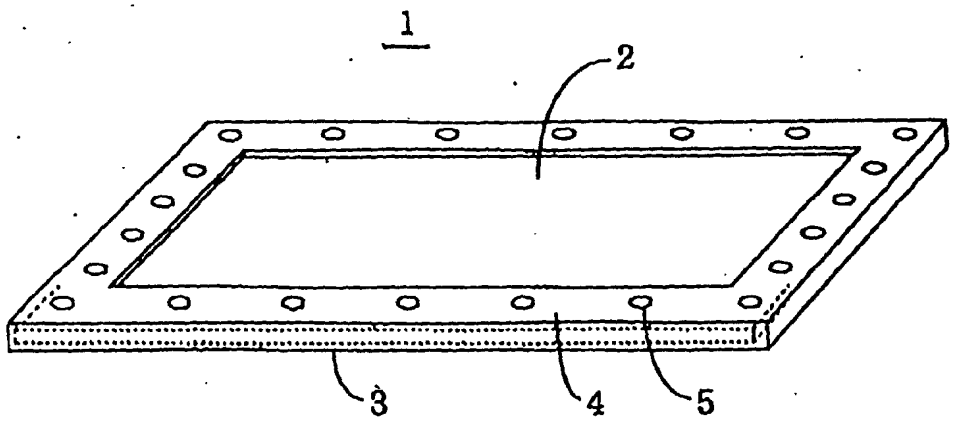


FIG.3

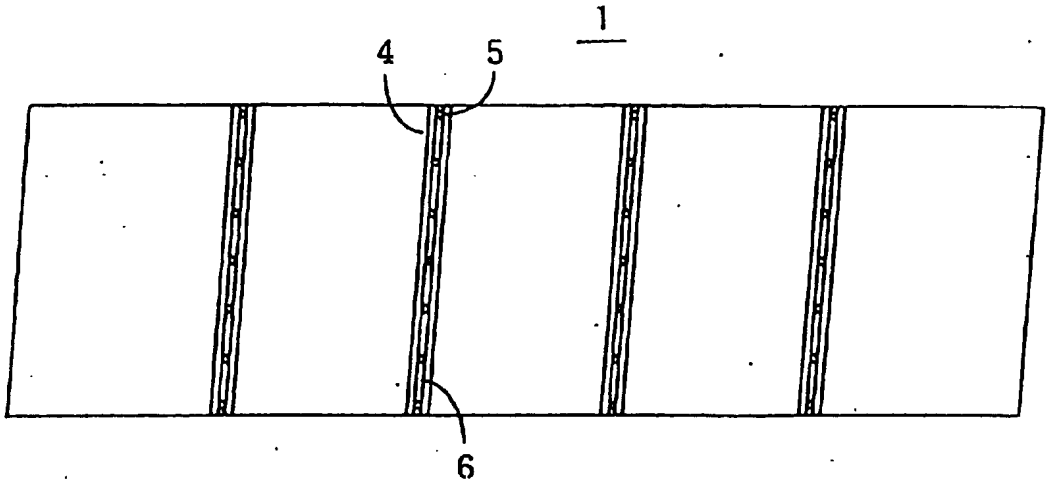


FIG.4

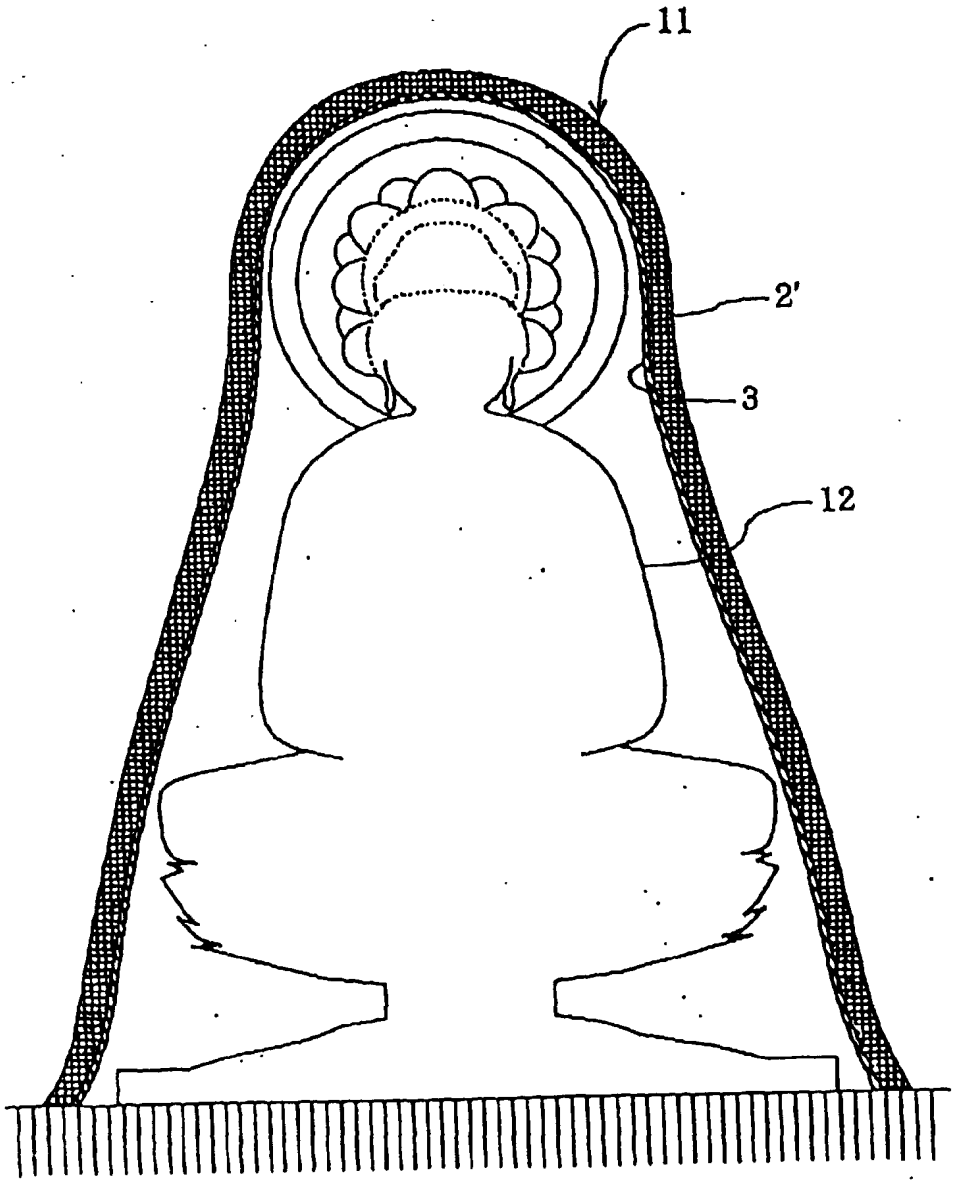


FIG.5

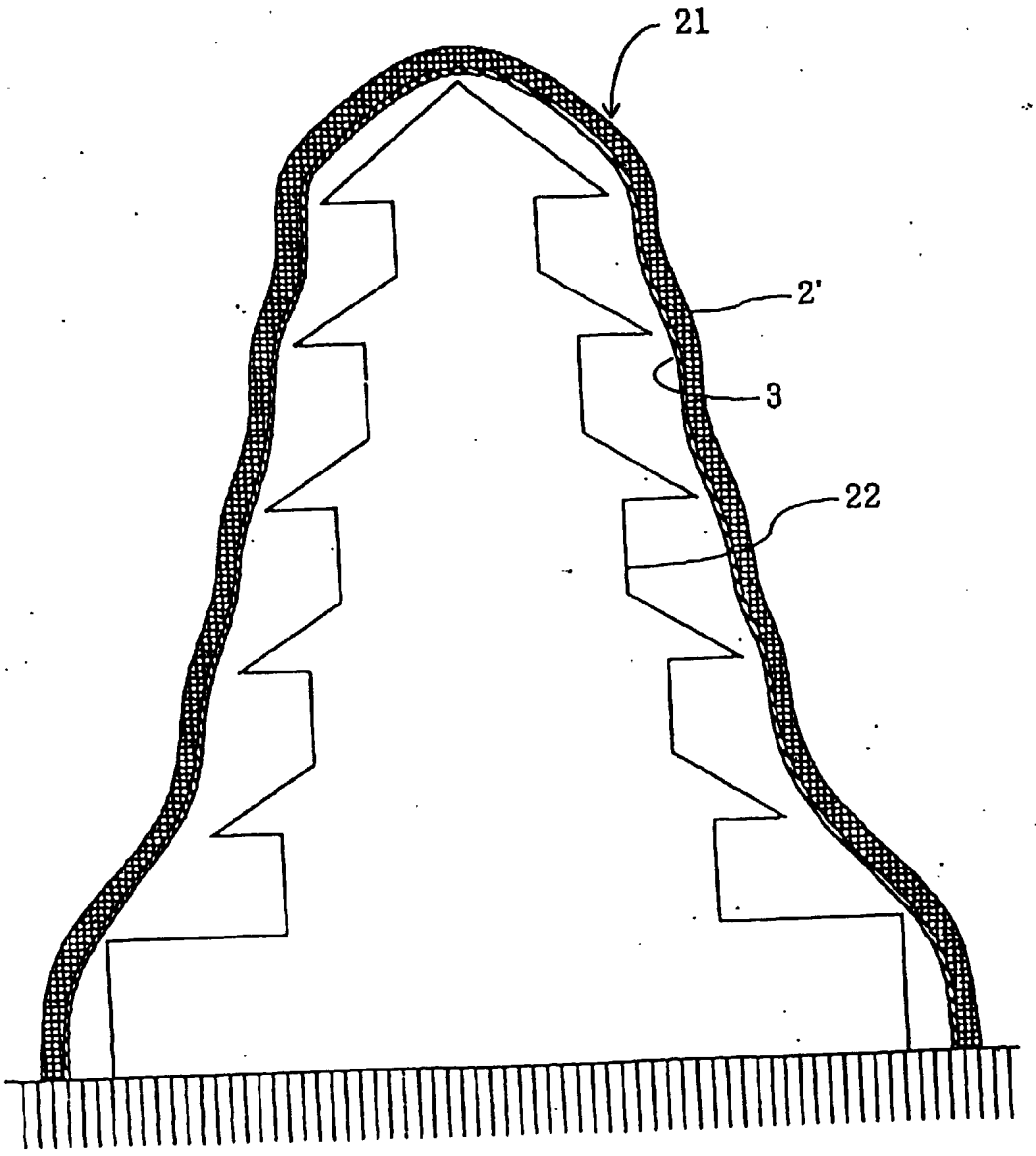


FIG.6

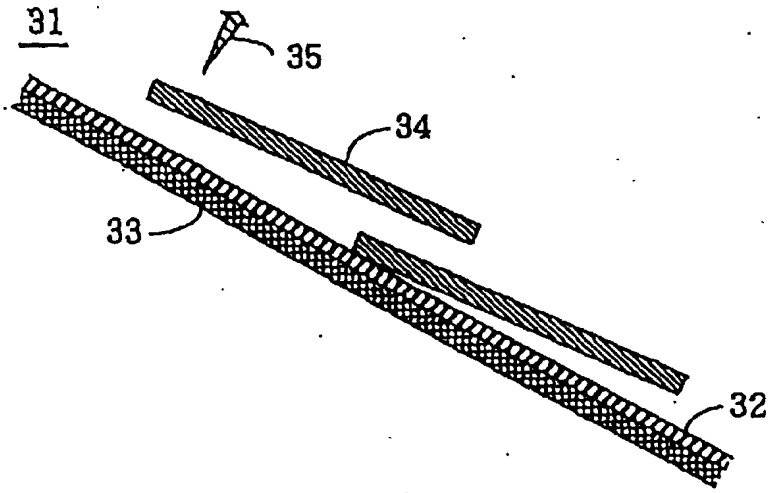


FIG.7

(the case where water is contained)

(a) fire-extinguishing sheet

(b) coat for disaster prevention

FIG.8

(the case where water is not contained)

(a) fire-extinguishing sheet

(b) coat for disaster prevention

FIG.9

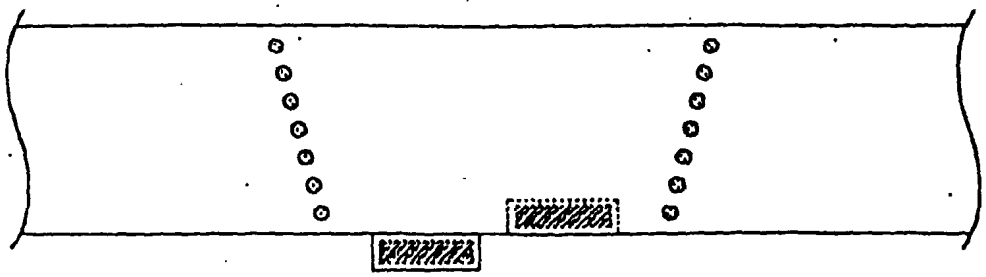
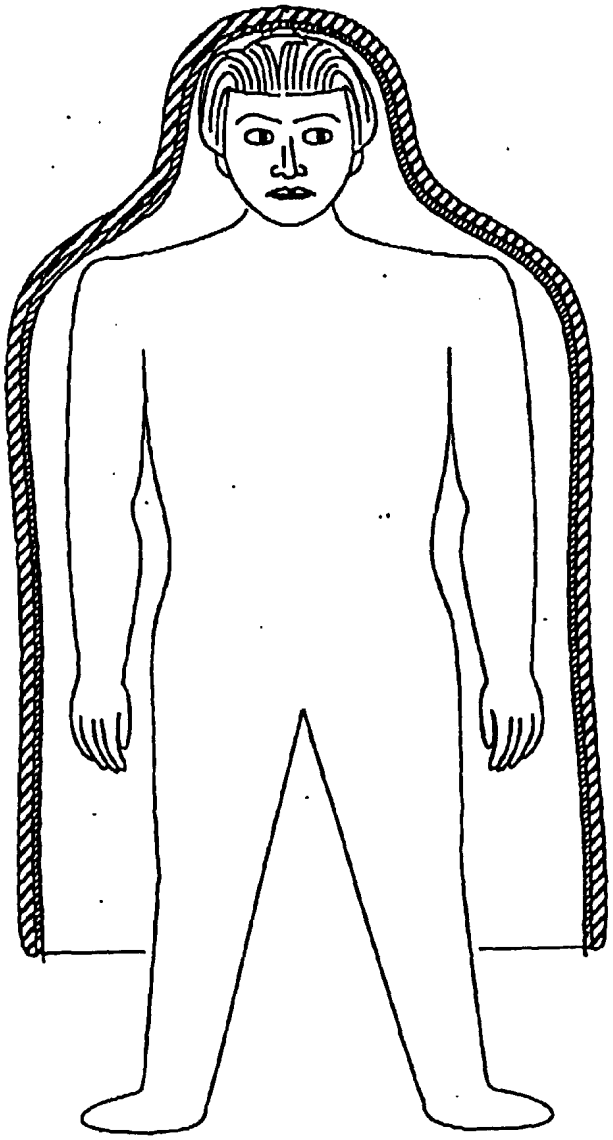


FIG.10



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP99/02058

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl[6] A62C2/00, A62C8/06, A62B17/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
Int.Cl[6] A62C2/00, A62C8/06, A62B17/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1926-1996 Toroku Jitsuyo Shinan Koho 1994-1999
Kokai Jitsuyo Shinan Koho 1971-1999 Jitsuyo Shinan Toroku Koho 1996-1999

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP, 61-284260, A (Shinnosuke Kataoka), 15 December, 1986 (15. 12. 86), Pages 1, 2 ; Figs. 1 to 3 (Family: none)	1-6, 8-11
Y	JP, 3021848, U (Takara Yousei Shizai K.K.), 12 March, 1996 (12. 03. 96), Pages 3 to 5 ; Fig. 2 (Family: none)	1-6, 8-16
Y	JP, 26-13892, Y1 (Ken'ichi Hori), 29 November, 1951 (29. 11. 51), Page 1 ; Figs. 1, 2 (Family: none)	2-6, 11
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 62-14079 (Laid-open No. 63-122554) (Masamichi Kaneda), 9 August, 1988 (09. 08. 88), Pages 1 to 3 ; Figs. 1 to 3 (Family: none)	3-6, 13-16
A	JP, 61-284260, A (Shinnosuke Kataoka), 15 December, 1986 (15. 12. 86), Pages 1, 2 ; Figs. 1 to 3 (Family: none)	7

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

* Special categories of cited documents:
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"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
12 July, 1999 (12. 07. 99)	21 July, 1999 (21. 07. 99)
Name and mailing address of the ISA/ Japanese Patent Office	Authorized officer
Facsimile No.	Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP99/02058

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP, 3021848, U (Takara Yousei Shizai K.K.), 12 March, 1996 (12. 03. 96), Pages 3 to 5 ; Fig. 2 (Family: none)	7
A	JP, 26-13892, Y1 (Ken'ichi Hori), 29 November, 1951 (29. 11. 51), Page 1 ; Figs. 1, 2 (Family: none)	7
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 62-14079 (Laid-open No. 63-122554) (Masamichi Kaneda), 9 August, 1988 (09. 08. 88), Pages 1 to 3 ; Figs. 1 to 3 (Family: none)	7
Y	JP, 53-51673, Y2 (Kimiyoshi Wakamatsu), 9 December, 1978 (09. 12. 78), Pages 1, 2 ; Figs. 1 to 3 (Family: none)	12-16
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 49-6838 (Laid-open No. 50-99797) (Matsumoto Seni Kagaku Kenkyusho), 19 August, 1975 (19. 08. 75), Pages 1, 2 ; Figs. 1, 2 (Family: none)	12-16

Form PCT/ISA/210 (continuation of second sheet) (July 1992)